Claim Amendments

Please amend the pending claims as follows:

1. (currently amended) An adaptive filter, comprising:

a filter input for receiving a first signal;

a filter output for outputting a second signal based upon said first signal to a summation device;

an error input for receiving an error input signal generated by a comparison of the second signal against a third signal; and

a plurality of ~~first~~ coefficients having a plurality of poles and a plurality of zeroes wherein said ~~first~~ coefficients are determined by deriving a finite impulse response (FIR) filter having a predetermined number of ~~second~~ FIR coefficients, obtaining convergence of said ~~second~~ FIR coefficients, converting said FIR filter into an infinite impulse response (IIR) filter, and updating the zeroes of said ~~first~~ coefficients based upon said error input signal while concurrently maintaining the poles of said ~~first~~ coefficients in a fixed state.

2. (currently amended) The adaptive filter of claim 1 wherein convergence of said ~~second~~ FIR coefficients is achieved using a Least Means Square approach.

3. (currently amended) The adaptive filter of claim 1 wherein updating the zeroes of said ~~first~~ coefficients is achieved using a Least Means Square approach.

4. (currently amended) A method for filtering a signal, comprising the steps of:

deriving, for an infinite impulse response

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(IIR) filter, a plurality of ~~first~~ IIR coefficients ~~of
an infinite impulse response (IIR) filter~~ wherein said
~~first~~ IIR coefficients have a plurality of poles and a
plurality of zeroes and are determined by deriving a
filter having a predetermined number of ~~second~~
coefficients, obtaining convergence of the filter, and
converting said filter into the IIR filter;

receiving a first signal;

outputting a second signal wherein the second
signal is a function of the ~~first~~ IIR coefficients and
the first signal;

receiving an error input signal generated by
a comparison of the second signal against a third
signal; and

updating the zeroes of said ~~first~~ IIR
coefficients based upon said error input signal and not
updating the poles of said ~~first~~ IIR coefficients.

5. (currently amended) The method of claim 4 further comprising
the steps of:

monitoring the error input signal; and

if the error input signal exceeds a
predetermined threshold, re-deriving the ~~first~~ IIR
coefficients by re-determining the predetermined number
of ~~second~~ coefficients of the filter, obtaining
convergence of the filter, and re-converting said
filter into the IIR filter.

6. (currently amended) The adaptive filter of claim 4 wherein
convergence of said ~~second~~ coefficients is achieved using a
Least Means Square approach.

7. (currently amended) An echo cancellation system for

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canceling echo within a second signal generated by the
transmittal of a first signal through a cross-coupling
pathway, comprising:

a summation device for summing a third signal
and the second signal to produce an error signal; and

an adaptive filter comprising a filter input
for receiving the first signal, a filter output for
outputting the third signal based upon said first
signal to the summation device, an error input for
receiving the error signal, and a plurality of ~~first~~
infinite impulse response (IIR) coefficients having a
plurality of poles and a plurality of zeroes wherein
the zeroes of said ~~first~~ IIR coefficients are updated
based upon said error signal and wherein the poles of
said ~~first~~ IIR coefficients are maintained in a
substantially fixed state[[.]] and wherein said IIR
coefficients are determined by deriving a finite
impulse response filter (FIR) having a predetermined
number of FIR coefficients, obtaining convergence of
FIR filter, and converting said FIR filter to derive
said IIR coefficients.

8. (canceled)

9. (original) A method for canceling an echo wherein the echo
   is generated by transmitting a first signal through an echo-
   causing system, comprising the steps of:

deriving coefficients of an infinite impulse
response (IIR) filter wherein said coefficients have a
plurality of zeroes and are determined by deriving a
finite impulse response (FIR) filter, obtaining
convergence of the FIR filter, and converting said
filter into the IIR filter;

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receiving a first signal;

outputting a second signal wherein the second signal is a function of the coefficients and the first signal;

receiving an error signal generated by a comparison of the second signal against a third signal; and

updating only the zeroes of said coefficients based upon said error signal.

10.   (currently amended) A gateway operative to transmit signals between a circuit switched network and a packet based network, comprising:

a plurality of digital to analog encoders and decoders; and

an echo cancellation device wherein said device comprises a summation device for summing a first signal and a second signal to produce an error signal and an adaptive filter comprising a filter input for receiving a third signal, a filter output for outputting the second signal based upon said third signal to the summation device, an error input for receiving the error signal, and coefficients having a plurality of zeroes wherein only the zeroes of said coefficients are updated based upon said error signal. a filter input for receiving a third signal, a filter output for outputting the second signal based upon said third signal, an error input for receiving the error signal, and a plurality of infinite impulse response (IIR) coefficients having a plurality of poles and a plurality of zeroes wherein the zeroes of said IIR coefficients are updated based upon said error signal and wherein the poles of said IIR coefficients are

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maintained in a substantially fixed state and wherein
said IIR coefficients are determined by deriving a
finite impulse response filter (FIR) having a
predetermined number of FIR coefficients, obtaining
convergence of FIR filter, and converting said FIR
filter to derive said IIR coefficients.

11.   (currently amended) A multi-channel echo cancellation
system for substantially reducing the presence of a
plurality of undesired frequencies in a plurality of first
signals, wherein said first signals are transmitted across a
plurality of channels, comprising:

at least one summation device operative in
each of said channels; and

at least one adaptive filter operative in
each of said channels wherein each of said adaptive
filters has a filter input for receiving a second
signal, a filter output for outputting a third signal
based upon said second signal to the summation device,
an error input for receiving an error signal generated
by a comparison of the first signal against the third
signal, and a plurality of first IIR coefficients
having a plurality of zeroes wherein said first IIR
coefficients are determined by deriving a filter having
a predetermined number of second coefficients,
obtaining convergence of said second coefficients,
converting said filter into an infinite impulse
response (IIR) filter to yield the first IIR
coefficients, and updating only the zeroes of the first
IIR coefficients based upon said error signal.

12.   (currently amended) An adaptive filter, comprising:
a filter input for receiving a first signal;

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a filter output for outputting a second
signal based upon said first signal ~~to a summation~~
~~device~~;

an error input for receiving an error signal
generated by a comparison of the second signal against
a third signal; and

a plurality of ~~first~~ coefficients having a
plurality of poles and a plurality of zeroes wherein
the zeroes of said ~~first~~ coefficients are updated based
upon said error signal and wherein the poles of said
~~first~~ coefficients are maintained in a substantially
fixed state[[.]] <u>and wherein the coefficients are
initially determined by deriving a finite impulse
response (FIR) filter having a predetermined number of
FIR coefficients, obtaining convergence of said FIR
coefficients, dividing said FIR coefficients into a
first set of FIR coefficients and a second set of FIR
coefficients, and converting said second set of FIR
coefficients into the coefficients.</u>

13.   (cancelled)

14.   (currently amended) An adaptive filter, comprising:
a finite impulse response (FIR) filter having
a plurality of ~~first~~ <u>FIR</u> coefficients wherein said
~~first~~ <u>FIR</u> coefficients are determined by deriving a FIR
filter having a predetermined number of ~~second~~
coefficients, obtaining convergence of said ~~second~~
coefficients, dividing said ~~second~~ coefficients into a
first set of ~~second~~ coefficients and a second set of
~~second~~ <u>\</u> coefficients, and adopting the first set of
~~second~~ coefficients as the ~~first~~ <u>FIR</u> coefficients; and
an infinite impulse response (IIR) filter

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having ~~an input for receiving a first signal, an output~~ ~~for outputting a second signal based upon said first~~ ~~signal, an error input for receiving an error input~~ ~~signal generated by a comparison of the second signal~~ ~~against a third signal, and~~ a plurality of ~~third~~ IIR coefficients wherein said ~~third~~ IIR coefficients have a plurality of poles and a plurality of zeroes and are derived from said second set of ~~second~~ FIR coefficients.

15.   (currently amended) The adaptive filter of claim 14 wherein the zeroes of the ~~third~~ IIR coefficients are updated based upon ~~said~~ an error input signal.

16.   (currently amended) The adaptive filter of claim 14 wherein the poles of the ~~third~~ IIR coefficients are fixed.

17.   (currently amended) A channel equalizing system for equalizing signals received in at least one channel, comprising:

an adaptive filter having a filter input for receiving a first signal, a filter output for outputting a second signal based upon said first signal, an error input for receiving an error signal, and a plurality of ~~first~~ infinite impulse response (IIR) coefficients having a plurality of poles and a plurality of zeroes wherein the zeroes of said ~~first~~ IIR coefficients are updated based upon said error signal and wherein the poles of said ~~first~~ IIR coefficients are maintained in a substantially fixed state[[.]] and wherein the IIR coefficients are initially determined by deriving an FIR filter having a predetermined number of FIR coefficients, obtaining

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<u>convergence of said FIR coefficients, and converting</u>
<u>said converged FIR coefficients into the IIR</u>
<u>coefficients.</u>

18.   (original) A method for equalizing a channel,
comprising the steps of:

deriving coefficients of an infinite impulse
response (IIR) filter wherein said coefficients have a
plurality of zeroes and are determined by deriving a
finite impulse response (FIR) filter, obtaining
convergence of the FIR filter, and converting said
filter into the IIR filter;

receiving a first signal;

outputting a second signal wherein the second
signal is a function of the coefficients and the first
signal;

receiving an error signal; and
updating only the zeroes of said coefficients based upon said
error signal.

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